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मानक

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IS 8507-2-1 (1981): Fixed insulated hermetically sealed tantalum capacitors with solid electrolyte, Part 2: Type FCST 1, Section 1: Polar [LITD 5: Semiconductor and Other Electronic Components and Devices]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard



SPECIFICATION FOR
FIXED, INSULATED, HERMETICALLY SEALED
TANTALUM CAPACITORS WITH SOLID ELECTROLYTE

PART II TYPE FCST 1
Section 1 Polar

0. General — This standard shall be read in conjunction with IS : 8507 (Part I)-1977 ' Specification for fixed, insulated, hermetically sealed tantalum capacitors with solid electrolyte : Part I General requirements and methods of tests '.

1. Outline Drawing and Dimensions — The outline drawing and dimensions shall be according to Fig. 1 and Table 1.

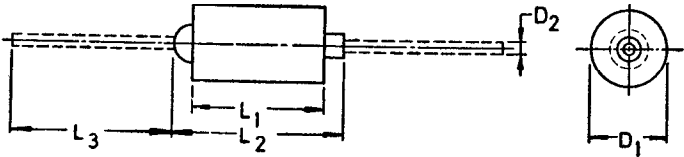


FIG. 1 POLAR SOLID TANTALUM CAPACITOR

Note 1 — The case insulation extends 0.38 mm beyond each end. However, when a shrink fitted insulation is used, it laps over the ends of the capacitor body.

Note 2 — The termination shall consist of tin-lead coated nickel wire.

TABLE 1 DIMENSIONS

Case Size	Dimensions, mm				
	L_1 ± 0.79	L_2 (Max)	L_3 (Min)	D_1 $+0.41$ -0.38	D_2
(1)	(2)	(3)	(4)	(5)	(6)
A	7.26	10.72	31.75	3.43	0.50 ± 0.05
B	12.04	15.49	31.75	4.70	0.50 ± 0.05
C	17.42	20.88	31.75	7.34	0.60 ± 0.06 -0.05
D	19.96	23.42	31.75	8.92	0.60 ± 0.06 -0.05

2. Ratings and Characteristics

- a) Rated capacitance see 4.1 of IS : 8507 (Part I)-1977
- b) Selection tolerance $\pm 5, \pm 10, \pm 20$ percent
- c) Rated voltage (U_R) see Table 2
- d) Category voltage (U_C) see Table 2
- e) Surge voltage (U_S) see Table 2
- f) Rated temperature 85°C
- g) Vibration 10-2 000 Hz, 200 m/s², 3 × 4 h
- h) Bump 4 000, 400 m/s²
- j) Shock 1 km/s²
- k) Acceleration 1 km/s²
- m) Climatic category 85/125/56 [see Appendix A of IS : 589-1961 Basic climatic and mechanical durability tests for components for electronic and electrical equipment (revised)]
- n) Low air pressure 2 kPa

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TABLE 2 RATED VOLTAGE (U_R), CATEGORY VOLTAGE (U_C) AND SURGE VOLTAGE (U_S)

U_R (at 85°C) V (1)	U_C (at 125°C) V (2)	U_S (at 85°C) V (3)
6.0	4	8
10	7	13
15	10	20
20	13	26
35	23	46
50	33	65
75	50	98
100	67	130

3. Marking — See 7 of IS : 8507 (Part I)-1977.

4. Construction and Workmanship — See 5 of IS : 8507 (Part I)-1977.

5. Classification of Tests — See 8.1 of IS : 8507 (Part I)-1977.

5.1 General Conditions for Tests — See 8.2 of IS : 8507 (Part I)-1977.

5.1.1 The test schedule and requirements shall be in accordance with Table 3.

TABLE 3 TEST SCHEDULE AND REQUIREMENTS

SI No.	Test	Clause Ref in IS : 8507 (Part I)-1977	Condition of Test	Requirement								
(1)	(2)	(3)	(4)	(5)								
i) <i>All Samples</i>												
a) Visual examination		8.4.1	—	The workmanship and finish shall be satisfactory. The marking shall be legible								
b) Dimensions		8.4.2	—	The dimensions of the capacitors and their terminations shall conform to values given in Table I used with Fig. 1								
c) Capacitance		8.3.2	—	The capacitance value shall correspond with the rated capacitance taking into account the tolerance								
d) Tangent of loss angle		8.3.3	—	The value shall not exceed : <table><tr><td><i>Rated Voltage</i></td><td><i>Tan δ</i></td></tr><tr><td>6.3 & 10 V</td><td>8 percent</td></tr><tr><td>15 & 20 V</td><td>6 percent</td></tr><tr><td>35 V</td><td>4 percent</td></tr></table>	<i>Rated Voltage</i>	<i>Tan δ</i>	6.3 & 10 V	8 percent	15 & 20 V	6 percent	35 V	4 percent
<i>Rated Voltage</i>	<i>Tan δ</i>											
6.3 & 10 V	8 percent											
15 & 20 V	6 percent											
35 V	4 percent											
e) Leakage current		8.3.1	—	Leakage current at 25±2°C shall not exceed 0.02 µA/µ E-V								
f) Voltage proof		8.3.4	—	There shall be no breakdown or flashover								
g) Insulation resistance		8.3.5	—	Insulation resistance shall not be less than 1 000 MΩ								
h) Sealing		8.4.10	—	There shall be no leakage of electrolyte and bubbling of gas when fully immersed in the solution								
ii) <i>First Group</i>												
a) Solderability		8.4.4	—	The tinning shall be uniform and good								
b) Robustness of terminations		8.4.3	—	—								
1) Visual examinations		8.4.1	—	There shall be no damage								
c) Bump		8.4.6	4 000, 400 m/s²	—								
1) Visual examination		8.4.1	—	There shall be no damage								
2) Capacitance		8.3.2	—	Change in capacitance value shall not exceed ±2 percent from the value recorded in (i) (c)								
3) Tangent of loss angle		8.3.3	—	As per initial limits								
4) Leakage current		8.3.1	—	As per initial limits								
d) Vibration		8.4.5	10-2 000 Hz, 200 m/s², 3×4 h	—								
1) Visual examination		8.4.1	—	There shall be no damage								
2) Capacitance		8.3.2	—	Change in capacitance value shall not exceed ±2 percent from the value recorded in (i) (c)								
3) Tangent of loss angle		8.3.3	—	—								
4) Leakage current		8.3.1	—	As per initial limits								

(Continued)

TABLE 3 TEST SCHEDULE AND REQUIREMENTS — *Contd*

SI No.	Test	Clause Ref in IS : 8507 (Part I)-1977	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
e)	Shock	8.4.7	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 2 percent from the value recorded in (i) (c)
	3) Tangent of loss angle	8.3.3	—	As per initial limits
	4) Leakage current	8.3.1	—	As per initial limits
f)	Acceleration (steady state)	8.4.8	1 km/s ² Rigidly mounted using brackets	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 2 percent from the value recorded in (i) (c)
	3) Tangent of loss angle	8.3.3	—	As per initial limits
	4) Leakage current	8.3.1	—	As per initial limits
g)	Rapid change of temperature	8.5.3	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 2 percent from the value recorded in (i) (c)
	3) Tangent of loss angle	8.3.3	—	As per initial limits
	4) Leakage current	8.3.1	—	As per initial limits
h)	Climatic sequence	8.5.1	—	—
	1) Dry heat	8.5.1.2	At maximum category temperature (+125°C) for 16 h	—
	2) Damp heat (accelerated) First cycle	8.5.1.3	—	—
	i) Visual examination	8.4.1	—	There shall be no damage
	3) Cold*	8.5.1.4	At minimum category temperature (-55°C) for 2 h	—
	i) Visual examination	8.4.1	—	There shall be no damage
	4) Low air pressure	8.5.1.5	2 kPa	There shall be no short circuit
	5) Damp heat (accelerated) remaining cycles	8.5.1.6	—	—
	i) Visual examination	8.4.1	—	There shall be no damage
	ii) Voltage proof	8.3.4	—	There shall be no breakdown or flashover
	iii) Insulation resistance	8.3.5	—	1 000 M Ω Min
	iv) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 2 percent
	v) Tangent of loss angle	8.3.3	—	As per initial limits
	vi) Leakage current	8.3.1	—	As per initial limits
iii)	Second Group			
	a) Damp heat (long term)	8.5.2	To one half of the specimens rated voltage shall be applied	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Voltage proof	8.3.4	—	There shall be no breakdown or flashover
	3) Insulation resistance	8.3.5	—	1 000 M Ω Min
	4) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 2 percent
	5) Tangent of loss angle	8.3.3	—	As per initial limits
	6) Leakage current	8.3.1	—	As per initial limits
iv)	Thrd Group			
	a) Endurance	8.7	—	—
	1) Visual examination	8.4.1	—	There shall be no damage
	2) Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 2 percent
	3) Tangent of loss angle	8.3.3	—	As per initial limits
	4) Leakage current	8.3.1	—	As per initial limits

*During the last 10 minutes of the period of exposure the rated voltage shall be applied to the specimens. No short circuit shall occur.

(Continued)

TABLE 3 TEST SCHEDULE AND REQUIREMENTS — *Contd*

SI No.	Test	Clause Ref in IS : 8507 (Part I)-1977	Condition of Test	Requirement
(1)	(2)	(3)	(4)	(5)
	5) Voltage proof	8.3.4	—	There shall be no breakdown or flashover
	6) Insulation resistance	8.3.5	—	1 000 M Ω Min
v) <i>Fourth Group</i>				
a)	Mould growth	8.5.5	—	There shall be no mould growth visible to naked eye
vi) <i>Fifth Group</i>				
a)	Resistance to soldering heat	8.4.4.2	—	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 5 percent
3)	Tangent of loss angle	8.3.3	—	As per initial limits
4)	Leakage current	8.3.1	—	As per initial limits
b)	Resistance to solvents	8.4.9	—	—
1)	Visual examination	8.4.1	—	The marking shall be legible and shall not rub off. There shall be no damage
vii) <i>Sixth Group</i>				
a)	Characteristics at low and high temperature	8.6	—	—
<i>Step 1 at 25°C</i>				
1)	Capacitance	8.3.2	—	As per initial limits
2)	Tangent of loss angle	8.3.3	—	As per initial limits
<i>Step 2 at -55°C</i>				
1)	Capacitance	8.3.2	—	Change in capacitance value shall not exceed ± 10 percent from the value recorded at Step 1
2)	Tangent of loss angle	8.3.3	—	As per initial limits
<i>Step 3 at 25°C</i>				
1)	Capacitance	8.3.2	—	The change in capacitance value shall not exceed ± 2 percent from the value recorded at Step 1
2)	Tangent of loss angle	8.3.3	—	As per initial limits
3)	Leakage current	8.3.1	—	As per initial limits
<i>Step 4 at +85°C</i>				
1)	Capacitance	8.3.2	—	The change in capacitance value shall not exceed ± 8 percent from the value recorded at Step 1
2)	Tangent of loss angle	8.3.3	—	As per initial limits
3)	Leakage current	8.3.1	—	As per initial limits
<i>Step 5 at +125°C</i>				
1)	Capacitance	8.3.2	—	The change in capacitance value shall not exceed ± 12 percent from the value recorded at Step 1
2)	Tangent of loss angle	8.3.3	—	As per initial limits
3)	Leakage current	8.3.1	—	As per initial limits
<i>Step 6 at 25°C</i>				
1)	Capacitance	8.3.2	—	The change in capacitance value shall not exceed ± 2 percent from the value recorded at Step 1
2)	Tangent of loss angle	8.3.3	—	As per initial limits
3)	Leakage current	8.3.1	—	As per initial limits
b) Surge		8.8	—	—
1)	Visual examination	8.4.1	—	There shall be no damage
2)	Capacitance	8.3.2	—	The change in capacitance value shall not exceed ± 2 percent
3)	Tangent of loss angle	8.3.3	—	As per initial limits
4)	Leakage current	8.3.1	—	As per initial limits
c) Salt mist		8.5.4	4 days	—
1)	Visual examination	8.4.1	—	There shall be no corrosion or any other damage
2)	Leakage current	8.3.1	—	As per initial limits